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“If $x^3 + y^3 = z^3$, then $(x^3 + z^3)^2 y^3 + (x^3 - y^3)^2 z^3 = (z^3 + y^3)^2 x^3$.

“This furnishes an easy proof of the impossibility of finding two integers the sum of whose cubes is a cube.”

“The writer has failed to see how this ‘easy proof’ follows and has been unable to find the question discussed or even mentioned in Tait’s collected works. Can some reader of the MONTHLY supply the missing link or links?”

20. Some of our readers would like to have a simple account, without proofs, of just what has been accomplished toward the proof of the theorem that the equation $x^n + y^n = z^n$ is impossible in integers when $n > 2$.

21. For the diophantine equation

$$x^2 - y^3 = 17$$

there are known the following solutions:

$$x = 3, \quad 4, 5, 9, 23, 282, 375, 378661,$$

$$y = -2, -1, 2, 4, 5, 43, 52, 5234.$$

One of our readers, who supplied the foregoing facts, desires to know the answers to the following questions: Are there other solutions of the given diophantine equation? How may all the solutions of this equation be found by a systematic procedure?

26. Why should not the nomenclature of mathematics be made uniform? For example, why call a circle a *portion of a plane* in elementary geometry and a *curve* in analytic geometry? Why call a sphere a *ball* at one time and a *surface* at another time? And so on through all the configurations of two- and three-dimensional geometry.

28. Is it possible to obtain $\int \cos \theta^2 d\theta$ without expanding $\cos \theta^2$? If it is not, can some interesting properties of this integral be determined by treating it as a special function?

30. A certain Normal University wishes to offer thirty-five hours of college mathematics for the benefit of high-school teachers. What should these courses be in order that, primarily, they may be of the greatest value to high-school teachers of mathematics and, secondarily, that they may furnish stimulus for a more extended pursuit of the subject?

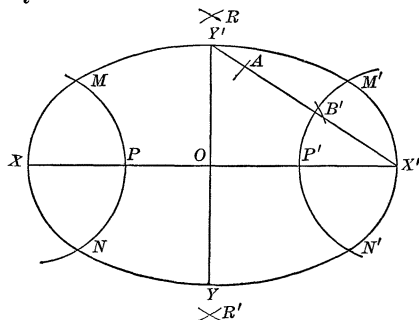
NEW QUESTION.

33. Under what conditions or to what extent is Mr. Iwerson’s construction, given below, a useful or practical approximation to a true ellipse? What criterion can be given to measure definitely the degree of approximation?

AN APPROXIMATE CONSTRUCTION FOR AN ELLIPSE.

By RICHARD IWERSON, Everett, Washington.

Given the axes of an ellipse, to construct approximately the curve by use of ruler and compasses only.



Draw XX' , the major axis, and YY' , the minor axis, perpendicular to and bisecting each other at O . Draw the line $X'Y'$. With O as center and Ox as radius describe an arc cutting $X'Y'$ at B . With Oy as radius and X' as center

describe an arc cutting $X'Y'$ at A . With AB as radius and X as center describe an arc cutting XO at P and extending on each side of XO toward Y and Y' . With the same radius (AB) and P as center draw an arc through X cutting the the arc just drawn in the points M and N . Construct in similar manner the arc $M'N'$ through X' . With NN' as radius and N and N' as centers describe arcs toward Y' cutting each other, obviously, in some point R on OY' (produced, if necessary). With R as center and RN as radius draw the arc NN' . In similar manner draw the arc MM' . The curve $XMYY'M'X'N'YNX$ is the required approximation.

Note.—The above construction obviously can not be a true ellipse, except for $a = b$, since the curvature on the arc NYN' is constant while the curvature of the ellipse is variable ($= a^4b^4/(b^4x^2 + a^4y^2)^{3/2}$). This suggests that the construction is a close approximation only in case the difference $a - b$ is small. There are, however, important applications of ellipses, such, for example, as the paths of the planets, in which the difference $a - b$ is small. In such cases Mr. Iwerson's construction might give valuable results if there were some definite criterion (possibly some function of the difference $a - b$ or of the eccentricity of the ellipse) which would readily and accurately measure the degree of approximation. Question 33 above is asked in the hope that some of our readers may be able to furnish such a criterion or suggest useful applications.—U. G. M.

DISCUSSIONS.

RELATING TO THE NUMBER OF TERMS BETWEEN TWO GIVEN TERMS OF AN ORDERED POLYNOMIAL.

By O. E. GLENN, University of Pennsylvania.

A complete homogeneous polynomial P of order m in n letters x_1, x_2, \dots, x_n may be said to have its terms arranged in normal order when the exponents in any two terms of P , as

$$t = C_{k_1 k_2 \dots k_n} x_1^{k_1} x_2^{k_2} \dots x_n^{k_n}, t' = C_{l_1 l_2 \dots l_n} x_1^{l_1} x_2^{l_2} \dots x_n^{l_n},$$

where t comes before t' , satisfy the condition that the first non-vanishing difference of the set

$$k_n - l_n, k_{n-1} - l_{n-1}, \dots, k_p - l_p, \dots, (k_1 - l_1),$$

is negative. We wish to prove that the number of terms of P between t and t' , including t' but not including t , is given by the formula

[illegible]